

Appl. No. 10/656,673
Atty. Docket No. 2003B089
Amdmt. dated March 31, 2006
Reply to Office Action of February 9, 2006

Amendments to the Claims

This listing of claims will replace all prior versions and listing of claims in this application.

Listing of Claims:

1-14. (Canceled)

15. (Currently Amended: ~~The process of claim 3~~ A process for selectively removing large catalyst particles from a reaction system, wherein the reaction system comprises a reaction zone and a disengaging zone, the process comprising the steps of:

- (a) feeding a plurality of catalyst particles into the reaction zone, wherein the plurality of catalyst particles comprises a molecular sieve selected from the group consisting of SAPO-5, SAPO-8, SAPO-11, SAPO-16, SAPO-17, SAPO-18, SAPO-20, SAPO-31, SAPO-34, SAPO-35, SAPO-36, SAPO-37, SAPO-40, SAPO-41, SAPO-42, SAPO-44, SAPO-47, SAPO-56, AEI/CHA intergrowths, metal containing forms thereof, intergrown forms thereof, and mixtures thereof;
- (b) contacting the plurality of catalyst particles with a feedstock comprising an oxygenate in the reaction zone under conditions effective to convert at least a portion of the feedstock to product comprising light olefins;
- (c) separating a portion of the catalyst particles from the product in a disengaging zone;
- (d) directing a portion of the plurality of catalyst particles separated in the disengaging zone to a counter-flow cyclone separator, wherein the portion of the plurality of catalyst particles has a first median particle diameter;
- (e) separating the portion of the plurality of catalyst particles in the counter-flow cyclone separator into a small catalyst stream and a large catalyst stream by modulating flow rate of a gas stream to the cyclone separator to control particle size of the catalyst streams, wherein the small catalyst stream has a second median particle diameter less than the first median particle diameter; and
- (f) directing at least a portion of the small catalyst stream to the reaction system.

16-19. (Canceled)

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20. (Currently Amended): ~~The process of claim 3, wherein step (b) forms an at least partially deactivated catalyst, the process further comprising the step of:~~ A process for selectively removing large catalyst particles from a reaction system, wherein the reaction system comprises a reaction zone, and a disengaging zone, the process comprising the steps of:

- (a) feeding a plurality of catalyst particles into the reaction zone;
- (b) contacting the plurality of catalyst particles with a feedstock in the reaction zone under conditions effective to convert at least a portion of the feedstock to product and to at least partially deactivate at least a portion of the catalyst particles;
- (c) separating a portion of the catalyst particles from the product in a disengaging zone;
- ~~(d)~~ regenerating the at least a portion of the partially deactivated catalyst in a catalyst regenerator to form the portion of the plurality of regenerated catalyst particles;
- ~~(e)~~ wherein step (e) comprises directing the at least a portion of the plurality of regenerated catalyst particles from the catalyst regenerator to the separation unit a counter-flow cyclone separator, wherein the portion of the regenerated catalyst particles has a first median particle diameter;
- (f) separating the regenerated catalyst particles in the counter-flow cyclone separator into a small catalyst stream and a large catalyst stream by modulating flow rate of a gas stream to the cyclone separator to control particle size of the catalyst streams, wherein the small catalyst stream has a second median particle diameter less than the first median particle diameter; and
- (g) directing at least a portion of the small catalyst stream to the reaction system.

21. (Currently Amended): ~~The process of claim 3, wherein step (b) forms an at least partially deactivated catalyst, the process further comprising the step of:~~ A process for selectively removing large catalyst particles from a reaction system, wherein the reaction system comprises a reaction zone, and a disengaging zone, the process comprising the steps of:

- (a) feeding a plurality of catalyst particles into the reaction zone;
- (b) contacting the plurality of catalyst particles with a feedstock in the reaction zone under conditions effective to convert at least a portion of the feedstock to product and to at least partially deactivate at least a portion of the catalyst particles;

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- (c) separating a portion of the catalyst particles from the product in a disengaging zone;
- (f)(d) stripping the at least a portion of the partially deactivated catalyst in a catalyst stripper to form the portion of the plurality of stripped catalyst particles;
- (e) wherein step (e) comprises directing the at least a portion of the plurality of stripped catalyst particles from the catalyst stripper to the separation unit a counter-flow cyclone separator, wherein the portion of the stripped catalyst particles has a first median particle diameter;
- (f) separating the stripped catalyst particles in the counter-flow cyclone separator into a small catalyst stream and a large catalyst stream by modulating flow rate of a gas stream to the cyclone separator to control particle size of the catalyst streams, wherein the small catalyst stream has a second median particle diameter less than the first median particle diameter; and
- (g) directing at least a portion of the small catalyst stream to the reaction system.

22. (Currently Amended): The process of claim 3, wherein the process further comprises the step of: A process for selectively removing large catalyst particles from a reaction system, wherein the reaction system comprises a reaction zone, and a disengaging zone. the process comprising the steps of:

- (a) feeding a plurality of catalyst particles into the reaction zone;
- (b) contacting the plurality of catalyst particles with a feedstock in the reaction zone under conditions effective to convert at least a portion of the feedstock to product;
- (c) separating a portion of the catalyst particles from the product in a disengaging zone;
- (d) removing at least a portion of the separated catalyst particles from the disengaging zone;
- (f)(e) cooling a heated catalyst particle from the reaction at least a portion of the particles removed from the disengaging zone in a catalyst cooler,
- (f) wherein step (e) comprises directing the at least a portion of the plurality of cooled catalyst particles from the catalyst cooler to the separation unit a counter-flow cyclone separator, wherein the portion of the stripped catalyst particles has a first median particle diameter;

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- (g) separating the cooled catalyst particles in the counter-flow cyclone separator into a small catalyst stream and a large catalyst stream by modulating flow rate of a gas stream to the cyclone separator to control particle size of the catalyst streams, wherein the small catalyst stream has a second median particle diameter less than the first median particle diameter; and
- (h) directing at least a portion of the small catalyst stream to the reaction system.

23-104. (Canceled)

105. (Currently Amended): The reaction process of claim ~~[[104]]~~113, wherein the catalyst particles are separated from the product in a disengaging zone having a larger cross sectional area than that of the reaction zone.

106. (Currently Amended): The reaction process of claim ~~[[104]]~~113, wherein the separation unit is selected from the group consisting of: a cyclone separator, a settling vessel, a screen, and an air classifier.

107. (Currently Amended): The reaction process of claim ~~[[104]]~~113, wherein the separation unit comprises a counter-flow cyclone separator.

108. (Currently Amended): The reaction process of claim ~~[[104]]~~113, wherein the feedstock comprises an oxygenate and the product comprises light olefins.

109. (Currently Amended): The reaction process of claim ~~[[104]]~~113, wherein the first catalyst stream has a median particle diameter greater than 20 microns and less than 120 microns.

110. (Currently Amended): ~~The process of claim 104, wherein step (b) forms~~ A reaction process in which catalyst particles are separated according to median particle size and directed to a reaction zone, the process comprising the steps of:

- a) contacting catalyst particles with a feedstock in the reaction zone to convert at least a portion of the feedstock to product and form an at least partially deactivated catalyst, the process further comprising the step of:
- b) separating a portion of the partially deactivated catalyst particles from the product;

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- c) regenerating the at least a portion of the partially deactivated catalyst in a catalyst regenerator and directing at least a portion of the regenerated catalyst from the catalyst regenerator to a the separation unit;
- d) modulating flow rate of a gas stream to the separation unit to separate catalyst particles in the separation unit into a first catalyst stream having a median particle diameter smaller than that of a second catalyst stream; and
- e) directing at least a portion of the first catalyst stream to the reaction zone.

111. (Currently Amended): The process of claim 104, wherein step (b) forms A reaction process in which catalyst particles are separated according to median particle size and directed to a reaction zone, the process comprising the steps of:

- a) contacting catalyst particles with a feedstock in the reaction zone to convert at least a portion of the feedstock to product and form an at least partially deactivated catalyst; the process further comprising the step of:
- b) separating a portion of the partially deactivated catalyst particles from the product;
- c) stripping the at least a portion of the partially deactivated catalyst in a catalyst stripper and directing at least a portion of the stripped catalyst from the catalyst stripper to a the separation unit;
- d) modulating flow rate of a gas stream to the separation unit to separate catalyst particles in the separation unit into a first catalyst stream having a median particle diameter smaller than that of a second catalyst stream; and
- e) directing at least a portion of the first catalyst stream to the reaction zone.

112. (Currently Amended): The process of claim 104, wherein the process further comprises the step of: A reaction process in which catalyst particles are separated according to median particle size and directed to a reaction zone, the process comprising the steps of:

- a) contacting catalyst particles with a feedstock in the reaction zone to convert at least a portion of the feedstock to product;
- b) separating a portion of the catalyst particles from the product;
- c) cooling heated catalyst separated from the product in the reaction system in a catalyst cooler and;

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- d) directing at least a portion of the cooled catalyst from the catalyst cooler to the a separation unit;
- e) modulating flow rate of a gas stream to the separation unit to separate catalyst particles in the separation unit into a first catalyst stream having a median particle diameter smaller than that of a second catalyst stream; and
- f) directing at least a portion of the first catalyst stream to the reaction zone.

113. (Currently Amended): ~~The process of claim 104,~~ A reaction process in which catalyst particles are separated according to median particle size and directed to a reaction zone, the process comprising the steps of:

- a) contacting catalyst particles with a feedstock in the reaction zone to convert at least a portion of the feedstock to product;
- b) separating a portion of the catalyst particles from the product;
- c) directing at least a portion of the separated catalyst particles to a separation unit;
- d) modulating flow rate of a gas stream to the separation unit to separate catalyst particles in the separation unit into a first catalyst stream having a median particle diameter smaller than that of a second catalyst stream;
- e) directing at least a portion of the first catalyst stream to the reaction zone, and
- f) ~~wherein the process further comprises monitoring the median particle diameter of the first catalyst stream.~~

114. (Previously Presented): The process of claim 113, wherein the monitoring is performed by a laser scattering particle size analyzer, a Coulter counter, a device for determining rate of sedimentation, or a mechanical screening device.